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Number 8

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SPECIAL FEATURES

A MODIFIED LE PERE FIGHTER
THE BRISTOL TEN SEATER
"WHO'S WHO IN AMERICAN AERONAUTICS"
BOMBING AT ABERDEEN
SENATORS AND ECONOMY

THE GARDNER, MOFFAT CO., INC.
HIGHLAND, N. Y.
225 FOURTH AVENUE, NEW YORK

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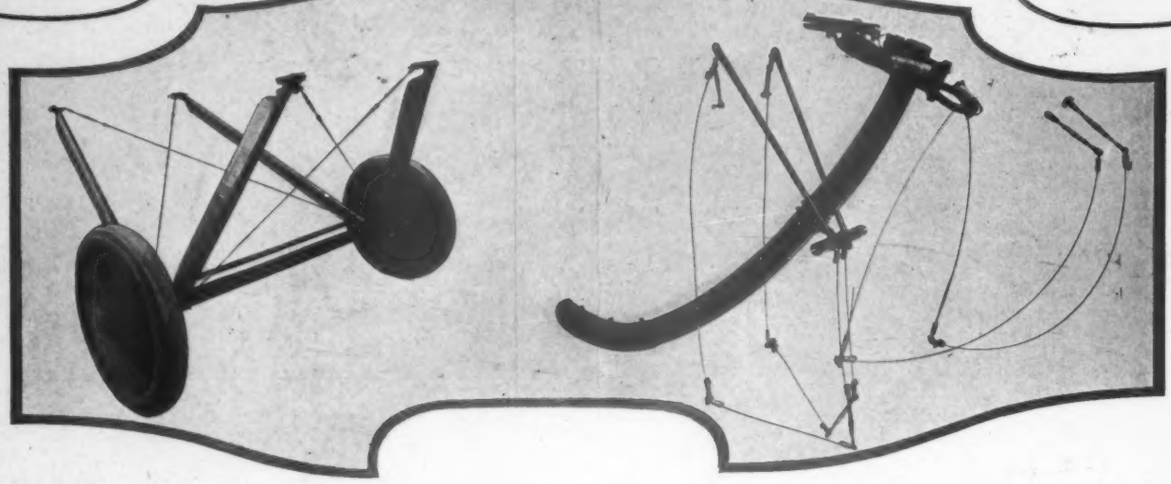

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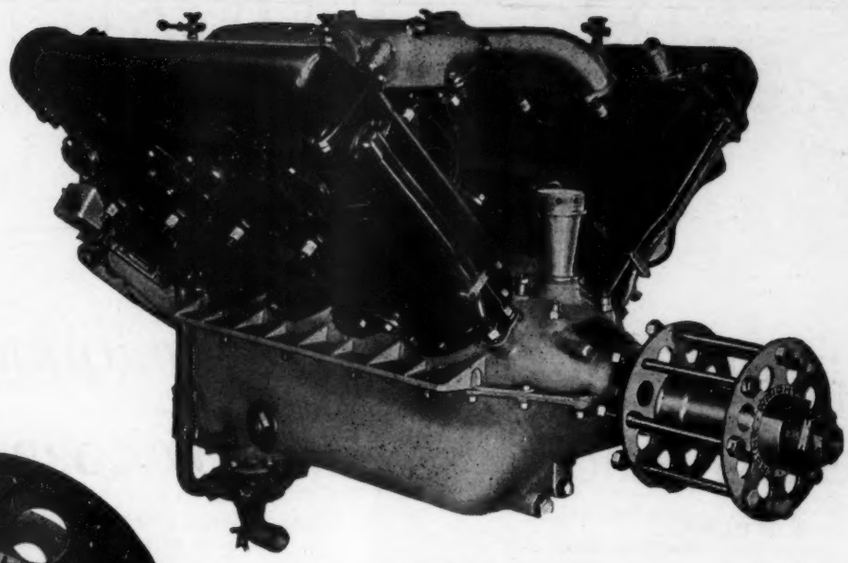

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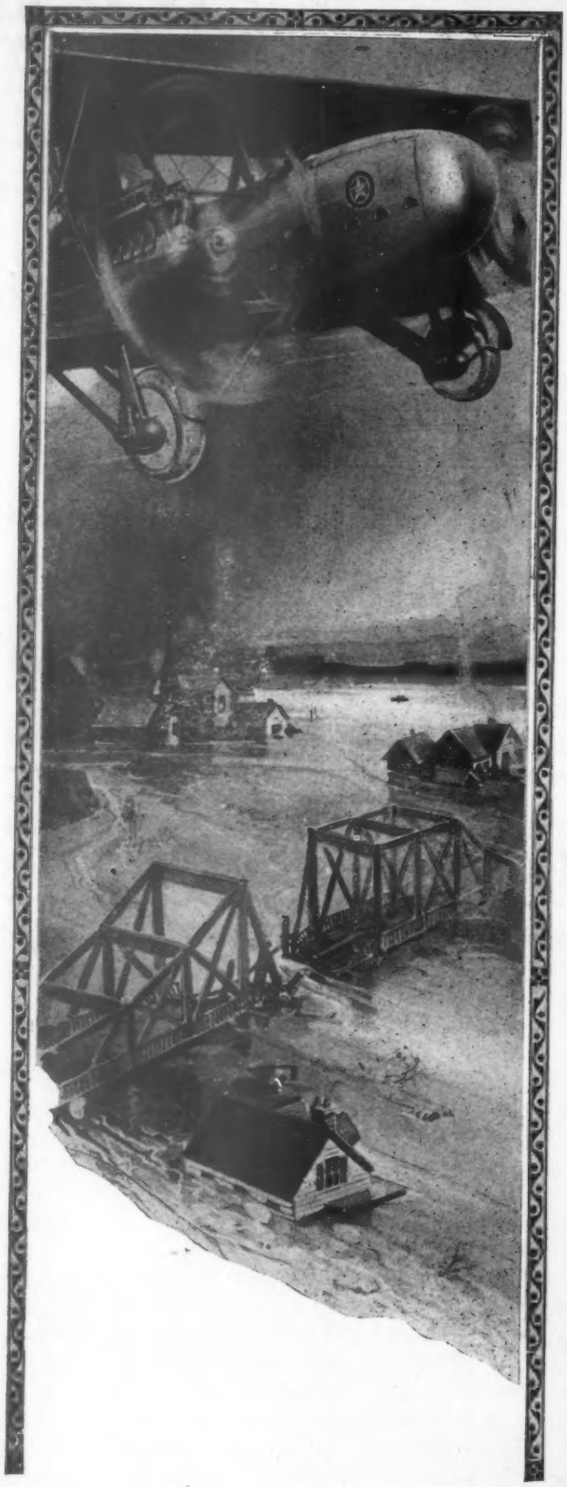

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AVIATION AND AIRCRAFT JOURNAL

LADISLAS D'ORCY, EDITOR
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Vol. XI AUGUST 22, 1921 No. 8

Aid to Aviation

FACING a situation with many points similar to the American aviation problem the British Air Ministry has recently announced a new plan for encouraging the continuation of the British cross-Channel services. A fund of £200,000 a year for three years has been provided, which includes the £50,000 subsidy under which the present British companies, Handley Page Transport, Ltd. and Instone Air Line, are operating. Actual payments to the operating companies are to be at the rate of 25 per cent of their annual gross earnings.

The most interesting feature of the plan is the provision for the placing of orders by the Air Ministry with constructors for "modern commercial types". The machines so constructed are then to be rented by the government to "approved firms" at a monthly rental of 2½ per cent of the cost of the machines. After thirty such payments the machine becomes the property of the operating company. While it is possible that a machine after thirty months would become obsolescent if not obsolete, the operating company will have paid 75 per cent of the depreciation charge while the Government has paid 25 per cent. In effect the company gets the machine on the installment plan for 75 per cent of its original cost.

Another provision is for insuring the machines by the operating companies in favor of the Air Ministry against loss or damage by accident resulting from operation, as well as normal insurance against fire, etc.

There is neither reason for nor prospect of the American aircraft industry receiving any direct government subsidy. But without a direct subsidy a method suggests itself whereby the government through the agency of the Post Office Department can lay a real foundation for commercial air transportation and at the same time make the air mail service self supporting. First the department could advertise a competition for mail carrying machines for specified routes. With approval of certain designs a number of the machines could immediately be ordered. The machines that make good would then be allocated to operating companies with whom the department would conclude mail contracts. The machines would remain the property of the government, their costs to be absorbed in the price of the mail contract. In other words the capital of a company operating with government machines would be conserved strictly for operating expenses. The cost of insurance also might well be borne by the government and in the same way absorbed in the cost of the contract.

At the same time our military needs would be served by creating an aircraft industry which could quickly be diverted to war aviation in the eventuality of such a necessity arising. Which again proves that the successful prosecution of our next war will depend on the convertibility of our commercial aircraft industry to a war industry.

Flying by Instruments

THERE have long existed two schools of thought among airplane pilots, the first maintaining that it is dangerous and undesirable for a pilot ever to depend on instruments to guide him in his flying while the second has advocated the use of instruments on every possible occasion. In the pre-war days of exhibition flying, when piloting was regarded largely as an acquired instinct, instruments found little favor, but the tendency has been more and more towards the use of instruments not only for navigation but for guiding the pilot in the actual flying of the airplane. This trend is likely to grow as airplanes grow larger and the pilot's accommodations become more completely enclosed, the functions of the commanding officer of a large airplane approximating more and more nearly to those of a captain of a ship. The necessity of instrumental assistance in cloud-flying is now generally conceded. The lack of faith in instruments which many pilots feel and which leads them to advocate the entire elimination of instruments for training machines is largely due to regrettable past errors in design and installation which have lead to false indications. The instrument designer has a great responsibility for the future of aerial navigation and for his own share in that future, and those who are responsible for the planning and production of airplanes should not overlook any opportunity of co-operating with the instrument companies in carrying that responsibility.

Further Education

THE daily press has just lately rendered a service to aviation—perhaps unconsciously, but nevertheless a service.

Two unfortunate accidents happened practically simultaneously. One on the sea to a sea-going craft, and the other also on the sea, but to an aircraft. In the former accident many lives were lost while in the latter none were lost. Both accidents were due to storms, but the aircraft was able to avoid the storm sufficiently to warrant its passengers being saved while such was not the case with the steamer.

The daily press published simultaneously, front page accounts of both these accidents, and thus showed the public that aviation, though still young as compared with sea travel in steamers, can quite justifiably lay claim to safety as a means of transport.

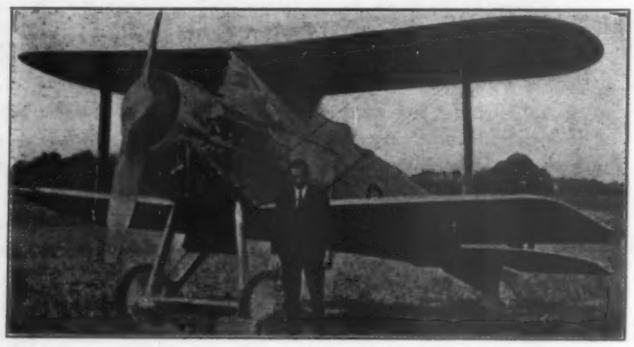
We wonder how many of the American public read these two accounts in the press, and as a result made up their minds never to set foot in an airplane; then in the next thought made arrangements for their vacations, many of which will include sea voyages with their accompanying perils which in view of the happening narrated above seem every bit as likely to materialize into accidents as those of air travel.

The British Aerial Derby

The British Aerial Derby was flown at Hendon Airdrome, London, on July 16. Lest the list of entries with their extreme range of power be wondered at let it be understood that two races were flown over the same course at the same time—the Derby and the Handicap. The entries were started according to their handicaps. The first machine to complete the course won the Handicap while the machine covering the course in the least time won the Derby.

The start and finish of the races were at Hendon, and the course was over two 100 mile circuits with five turning points.

The races were under the auspices of the Royal Aero Club which awarded the following prizes: Derby winner, £400 ($2,000) and trophy; Handicap winner, £200 ($1,000) and tropy; second, £100 ($500), and third, £50 ($250).



THE MARS I WITH MR. JAMES, THE PILOT, STANDING BY IT
Courtesy The Aeroplane

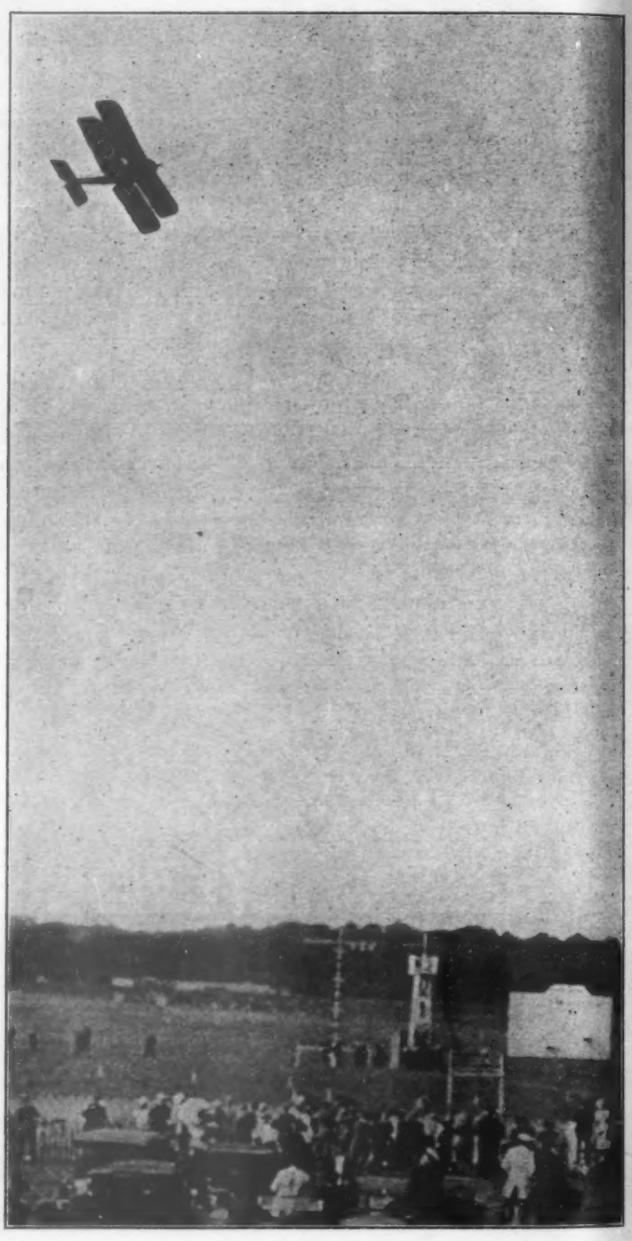
The machines entered with their engines, pilots and handicaps were as follows:

MACHINE AND ENGINE	PILOT	HANDICAP h.	m.	s.
Avro Baby, 35 hp. Green	Tully	1	15	42
Avro Baby, 35 hp. Green	Hinkler	1	17	24
Sopwith Pup, 80 hp. Rhone	Forestier-Walker		37	6
Bristol Tourer, 240 hp. Sidley-Puma	Butler		37	6
Avro Viper, 220 hp. Hispano-Suiza	Tait-Cox		33	30
Sopwith Camel, 130 hp. Clerget	Broad		30	3
SE5A, 180 Hispano-Suiza	Longton		28	6
SE5A, 180 Hispano-Suiza	Ortweiler		28	6
Nieuport Nieuhawk, 300 hp. A.B.C.	Noakes		17	54
Martinsyde, 300 hp. Hispano-Suiza	Foot		12	18
Bristol Bullet, 400 hp. Bristol	Uwins		7	42
Mars 1 (Bamel), 450 hp. Napier	James		4	42

(This machine was virtually scratch on account of the withdrawl of M. Sadi Lecointe's entry which was actually scratch.)

The winner of both the Derby and the Handicap was the Mars 1 piloted by Mr. James at 163 m.p.h. This machine was designed by Mr. Folland and built by the Gloustershire Aviation Co., and has received the peculiar nickname of "Bamel" although just why it bears this name cannot be seen from the lines of the machine. It is noteworthy that the SE5A which actually finished first but was disqualified because of a faulty turn by Mr. Ortweiler, and the Nieuport Nieuhawk piloted by Flt. Lt. Noakes which was well in the running until forced to land just short of the finish due to lack of fuel were also designed by Mr. Folland. In connection with Flt. Lt. Noakes's bad luck it is interesting to note that both Mr. Ortweiler's SE5A and Mr. James's Bamel were carrying so little fuel load that their engines stopped for lack of it while the machines were gliding in to land.

It was unfortunate that the two French entries were withdrawn on account of accidents during testing as they both would undoubtedly have put up very creditable performances. Furthermore, mention need hardly be made of the regret, and the cause therefor, of the late Mr. Hawekr's absence from the race with the Nieuport Goshawk he was to have flown.

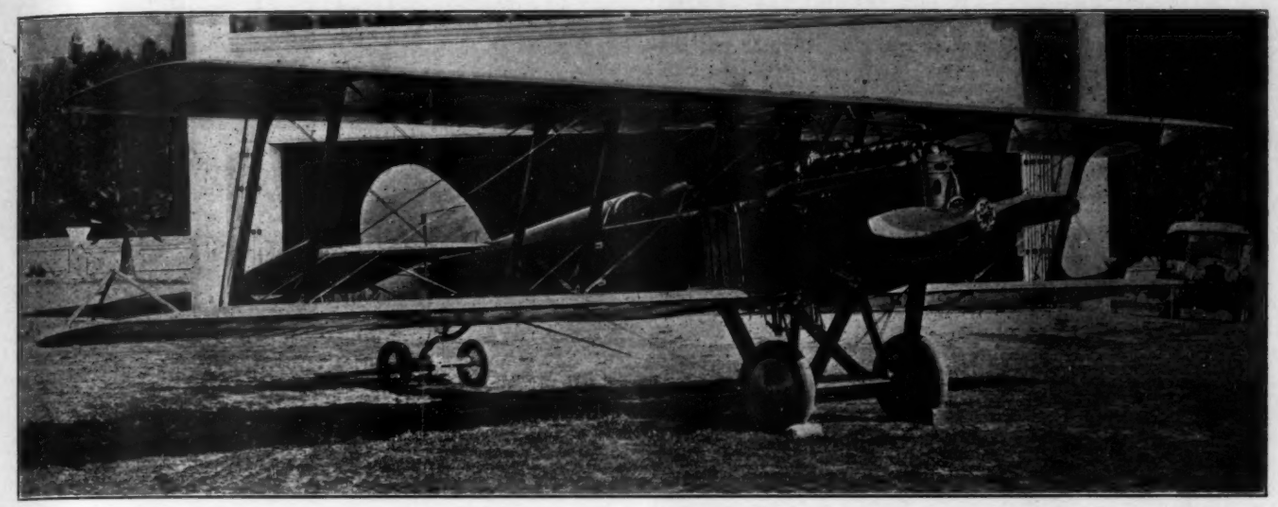


MR. ORTWEILER, FIRST BUT DISQUALIFIED, CROSSING THE FINISH
Wide World Photo

Casablanca Service

Flghts between France and Casablanca, in Morocco, are now being made four times a week, and a daily service is being planned. The trip from Paris requires two days, largely because passengers from Paris must go by rail to Toulouse. Air trips from London to Casablanca cost slightly more than 45 pounds, while the rail and water journey costs a little more than twenty pounds. The passenger, however, saves four days in time.

A Modified Le Pere Fighter



A Modified Le Pere Fighter. Note the Wind Driven Fuel Pumps at the Root of the Lower Starboard Wing.

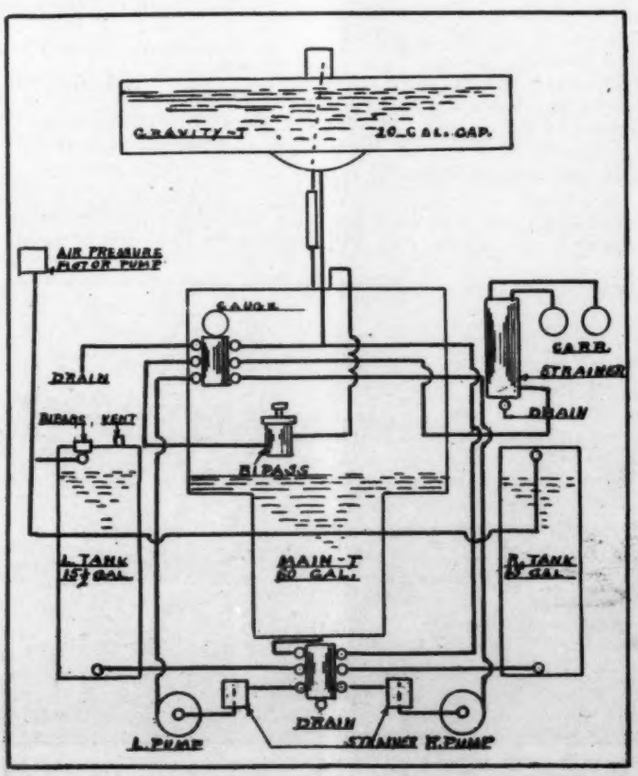
A prominent Californian sportsman, Mr. L. C. Brand had a Le Pere Fighter which he wanted remodelled for pleasure flying and racing, at the same time retaining the original attractive lines of the machine. The work has been done to the design of G. Edw. Barnhart, an Aeronautical Engineer of Pasadena, Calif. The requirements which Mr. Barnhart had to meet with the redesign of the machine, and his manner of meeting them were as follows.

1. The machine was to land at less than 60 m.p.h. with no change in maximum speed.

In order that the machine might land slowly it was necessary to increase the surface of the stabilizer so as to produce the proper stiffening control as the machine had previously lost flying speed at 75 m.ph. This increase added the essential stiffness when there was a change of load and rendered piloting less tiresome on long trips. The camber of the stabilizer and elevators was changed so that they might be more effective at small angles.

It is interesting to note that though the stabilizer surface was increased, no change in top speed was detected during the tests; despite the fact that it showed slightly less by calculation. In the trials the machine did not lose flying speed even below 55 m.p.h. and had an horizontal slow speed of 52 m.p.h. at 3000 ft.

2. The machine was to carry pilot alone or with one or two passengers. In any of these cases a full load or a light load of fuel and oil was to be carried without the machine being either nose or tail heavy with the power on or off and without the use of the stabilizer adjustment.



The Fuel System of the Modified Le Pere Fighter

To satisfy the condition of varying load, a stabilizer adjustment already on the machine was used with modification. This set the stabilizer for any particular load.

3. With the power on or off the machine was to fly at high or slow speed without nose or tail heaviness and without requiring an adjustable stabilizer while in the air.

In satisfying the condition for slow speed (see first condition) a part of this problem was overcome. The main loading on the tail surfaces due to shift of the center of pressure could be taken care of, but it was desirable to shift the center of gravity in relation to the thrust line; and to shift the thrust line itself in relation to the center of gravity to assist in overcoming the difficulties so that the thrust would not impose so much load on the tail surface.

At high speed horizontal flight condition the engine thrust now make a negative angle of one degree.

4. If possible, the structure of the machine was to be lightened.

It was found that by building new surfaces—the elevators, stabilizer, and ailerons—the structure could be materially lightened. The tail skid assembly was also lightened. To have lightened other parts of the structure at this time would have delayed the progress of reconstruction more than was desirable.

5. The free movement of the aileron system was to be eliminated because it did not produce useful results.

In the first modification there were gears attached to the control shaft and mounted on the wood structure. This caused some lost motion. Torsion tubes allowed considerable free motion because they were over stressed. The torque tube

was attached to the lower ailerons with only a spreader between the ailerons. This spreader ran from the top of the lower aileron to the bottom of the upper aileron, which caused the upper and lower ailerons to have radically different actions which was quite unsatisfactory.

To correct this condition a quadrant was used on the aileron stick shaft with external wires and pulleys since it was not practicable to open the entire wing covering so as to put the Le Pere bell crank system in place.

6. A new fuel system was to be installed to provide:
   (a) Fuel normally delivered to the carburetor under pressure without pressure on the main supply tank.
   (b) An auxiliary air pressure system for use in emergencies.
   (c) Gravity flow to the carburetor.
   (d) Delivery of fuel by either of two pumps.
   (e) Drainage of the main tanks without interference with the other tanks.
   (f) Fuel flow to any system of pressure or pumps from any tank.
   (g) Fuel flow with a factor of safety.

The lay-out of the fuel system as shown will make plain its advantages.

The pumps are of the air-driven centrifugal type. They deliver 120 gallons of fuel per hour. The centrifugal pumps will show pressure but they will not build it up beyond their capacity to hold it. A fuel flow bypass is installed to hold the pressure at any desired point. The air pressure pump is the Standard Liberty equipment. An air bypass is used to regulate the pressure on the tanks.

The gauge showing the fuel pressure is located so as to show, with a very slight error, the actual pressure at the carburetor. Should there be a stoppage in the line between the gauge and the carburetor, the reading for this pressure will not be correct.

The conventional olive and rubber hose connections are used. Soft annealed one-half inch copper tubing replaced metallic flexible hose of a diameter smaller than one-half inch.

7. Any tendency to ground loop in landing was to be removed as far as possible.

The rudder surface was increased in order to give better control on the ground. The rudder which was on the machine was of steel tube structure. To save time these tubes were simply extended for increasing the surface; however, this structure might have been lightened materially.

The action of the tail skid was also changed to help to overcome any tendency to ground looping.

8. The machine was to land with a short run.

The tail skid was made to act more as a brake to check forward motion and slow the machine up on the ground. It now digs into the ground rather than slides over it.

9. Any tendency to nose over in soft ground was to be removed as far as possible.

By slowing up the machine the tendency to nose over was greatly lessened. The angle between the wheels and the center of gravity was increased. This change was made by a shift in the location of the center of gravity both vertically and longitudinally.

10. The tail skid was to have a full spring action.

This was accomplished by springing the tail skid on rubber exerciser cords.

11. The side radiators were to be removed so that the pilot might have unobstructed view for landing and general flying.

The radiators are now mounted on the side of the body with their tops just reaching the upper longeron.

12. A sufficiently large flow of oil between the two 7½ gal. tanks was to be provided as the intake was on one tank and the outlet on the other.

This oil flow was provided for by the installation of a 1¾ in. pipe between the tanks to replace the ¾ in. pipe.

13. A portion of the balanced part of the elevators was to be removed because they did not allow sufficient feel and were slightly overbalanced.

The over-balancing was eliminated by the construction of new elevators.

14. When the engine was throttled quickly or for a prolonged period of time, the inverted direction of the exhaust manifold caused the gas to hang in the rear or low end of it; causing a minor explosion in the manifold and a flaming from the exhaust pipes. This was to be removed.

The Standard Liberty pipes were used with the openings to the rear. This eliminated the trouble.

Mr. G. G. Budwig was Mr. Brand's personal representative on the work of remodeling, and he was responsible for many changes and improvements. Mr. Budwig states that the machine is now fine to fly and that it handles a great deal better than a D.H.-4.

The engineering and design was done by Mr. G. Edw. Barnhart who was employed as consulting engineer. The actual rebuilding was done under the supervision of Mr. L. G. Stern, superintendent of the C. R. Little Aircraft Co. of Pasadena, Calif.

New Airplane Co.

The Harrisburg Airplane Co. has been incorporated in Pennsylvania by C. F. Hoover, Walter R. Sohn and Robert E. P. Hoover all of Harrisburg, Pa.

Ardmore, Okla., Aero Club

The Aero Club of Ardmore has been organized with the following officers: Dr. Walter Hardy, Pres.; J. B. Champion, Vice-pres.; Harold Wallace, Treas.; and Florence Bradley, Sec. The club is not yet in a position to take up active flying and so for the time being plans to confine its interests to furthering the cause of aviation.

THE LE PERE FIGHTER BEFORE MODIFICATION. THE MACHINE IS SHOWN FITTED WITH A SUPERCHARGER ON THE ENGINE

Senators Urge Nation to Save Millions by Increasing Air Defense Over Sea

Bombing Tests Show Vulnerability of Battleships and Imperative Need of Aircraft Carriers

Extracts from the remarks of Senators Borah, Nichelson, King, Stanley, and Jones of Washington during the debate on the Aircraft-Battleship bombing tests of July 21. (Congressional Record, August 5, 1921; pp. 5051-5054.)

$400,000,000 for Obsolete Defense

Senator Borah:—"We are expending now about $400,000,000 upon the Navy, and since the experiment off the Virginia coast I have been convineced that we are expending at least $240,000,000 of it in a way that will not add any security to the people of the United States. The experiment off the Virginia coast demonstrated that which the best minds in the naval life of England have asserted for the last year and a half, that the battleship is practically obsolete.

Aircraft Sink "Unsinkable" Dreadnought

Senator Borah:—"We are building sixteen battleships, costing from $40,000,000 to $42,000,000 apiece, and in less than thirty minutes, as Gen. Mitchell told us he would, they sunk the ship which Von Tirpitz said was an unsinkable ship. Yet the airplane development is just beginning. It is just in its youth. Nay, more, it has not accomplished anything compared with what it will accomplish, according to those who are informed, even within the next year. Yet we go forward building these great battleships at this enormous expense, knowing that inside of two years the airplane will have rendered this particular type of battleship absolutely worthless as a defensive proposition.

Senator Borah:—"Mr. President, there are six of those great battleships of the "Indiana" class, costing from $40,000,000 to $42,000,000 apiece to build, upon which very little work before the aircraft service has even reached what it contends is its first period of success in these matters."

Senator Nicholson:—"Under the Senator's reasoning would it ever be possible to land an army on foreign soil, provided that the Nation spent sufficient money to have airplanes capable of carrying the bombs of which the Senator speaks?"

Senator Borah:—"The Senator has suggested a very important proposition. An admiral stated to me a few days ago that not only the experiment off the Virginia coast demonstrated that the battleship as it is now being built is practically obsolete, but it demonstrated further that with sufficient airplane and submarine protection, this country was perfectly safe from attack from any other country."

Destroy Troopships from Air

Senator Jones:—"This shows, too, that while possibly the airplane would not do vital damage to a battleship by striking it on the deck, yet it would absolutely destroy transports carrying troops."

Senator Borah:—"Yes. Of course Mr. President, it might be inferred from something I have said that I would like to see our naval building stop entirely, regardless of what other nations do. I do not take that position. I do not wish that to be understood. What I say is that we are putting this vast amount of money into these ships without getting any corresponding security and without getting any safety such as we are entitled to have for that amount of money. We had infinitely better take $40,000,000 out of these battleship expenditures and put it into airplanes and submarines if we want real security and real safety. I do not think in the

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Editorial in New York Times, July 23, 1921

Of the sinking of the former German dreadnought Ostfriesland by army aviators, General Williams, Chief of Ordnance, said: "A bomb was fired today that will be heard around the world". He added: "The capital ship now faces a new menace that must be guarded against by every possible study and effort." As the practical way to guard against that menace is to acquire an air force equal or superior to that of any other sea power, it devolves upon Congress to supply the necessary appropriations. The alternative, it should be emphasized, is limitation of armaments by agreement with other nations.

Naval men who held that the heavily armored battleship would withstand assaults from the air and remain afloat have been confounded. It was only a question of the explosive power of the bomb used. Brig. Gen. William Mitchell's dictum that "the air force will constitute the first line of defense of the country" no longer seems fanciful to open-minded champions of the capital ship. They must admit that the tests off the Virginia Capes support this contention of his:

A nation unequipped to concentrate her whole air force over the water, if the decision lies there, can just as well leave her navies tied up to the wharves instead of sending them out to certain destruction against a hostile country equipped for this purpose.

If there were war tomorrow with a sea-and-air Power possessing swift airplane carriers and a well-trained and numerically strong aviation corps, the United States fleet could not face the risk of putting to sea, and it would be in great danger of being sunk at its moorings. Little comfort can be got out of the view that under service conditions the Ostfriesland would probably have escaped destruction. If 2,000-pound bombs dropped near a dreadnought open her "seams" and make a sinking hulk of her, she will always be in danger night and day in a sea campaign. Anti-aircraft guns are not to be depended upon; they register too many misses, and when a squadron of planes concentrate for an attack the battleships will always be at a great disadvantage. Besides, it must be considered that while the hull may avoid for a time shocks that would send it to the bottom, the crew could not live on its deck during a bombardment. Add gas shells to the ordinary rending explosives, and the chances of the complement of the ship would be desperate, almost nil.

Twenty-one minutes of attack sufficed to sink the once formidable Ostfriesland, and the seven 2,000-pound bombs that sent her down were dropped, not by sailors in seaplanes, but by soldiers who had flown 100 miles from an inland air field to the rendezvous! It was not necessary to burst her deck open. The bombs that executed sentence of death upon her were dropped alongside. Who on board could have survived the disruptive power of those explosives? The achievement was a great triumph for the intelligent, strong-willed, persistent Assistant Chief of the Army Air Service, a leader who asks no subordinate to take any greater risks than he is willing to face himself. It is pleasant to remember that Brig. Gen. William Mitchell won many decorations by his gallantry and daring in France.

In a contribution to the May World's Work Admiral Sims said: "If the claims of the airplane advocates can be realized, it means that any battleship operating within the radius of planes which are in control of the air will be disabled or destroyed." If those claims have not been fully realized, no fair-minded officer will now argue that the acquisition of a formidable naval air force is not more important than the completition of the three-year capital ship construction program.

has been done, upon which a very small percentage of building has been accomplished, and if we want to save, wou'd it not be wise to discontinue the building of those six batt'eships of the Indiana type; not only to slow down, as I understand the order has already been given—not only to slow down, but to abandon and clean up the contracts? If it costs us $10,000,000 to clean up the contract, very well and good; we will have saved $230,000,000 or more by doing that. If it costs us $40,000,000 or $50,000,000, we will have saved $200,000,000 or more by doing so, and in my opinion, unless we are willing to do that, Mr. President, unless we are willing to cut the Army to 100,000 men and reorganize the official organization of the Army, and unless we are willing to take the lesson which we have had given to us off the Virginia coast, and discontinue the building of at least six or eight of these battleships, there is no place where we can cut any expenditures that will amount to anything considerable."

First Bomb Was Fatal

Senator Jones:—"Mr. President, I had the privi'ege of seeing the bombing of that German battleship, and I heard some of the expert naval officers talking with reference to that ship and the character of its construction before it was sunk, and one of them said that, in his judgment, it was a thousand to one that the ship would not be sunk by the bombing. He was thoroughly acquainted with the character of the construction, with the water-tight compartments, and all that sort of thing; and yet, as the Senator from Idaho has said, within 15 or 20 minutes from the dropping of the first 2,000-pound bomb the ship was sunk."

Sheer Waste of Money to Continue Building Battleships Now

Senator Borah:—[*Senator Borah read into the record an editorial from the New York Times which is reproduced elsewhere on this proof*]. "Mr. President, without assuming to say that the battleship is absolutely obsolete and can never be made effective by any changes which may be made or any different construction which may be had, it does seem to me conclusively established that to go forward and build these battleships at this time until this testing proposition has been carried to its final conclusion, until we know what is needed, what kind of battleship will stand it, is a mere sheer waste of money. No man in the Senate, as a business man, a member of a corporation, a stockholder, or having anything to say with reference to the expenditure of his money upon that kind of an enterprise, would consent to it for a moment. He would say, "Let us know whether we are putting $42,000,000 into each one of these ships that can be sunk in 21 minutes building of battleships we are giving our country any security or any safety at all, comparatively speaking."

Strength and Influence Greatly Impaired

Senator King:—"I think those tests demonstrated the vulnerability of the battleship, and demonstrated that, while it is not obso'ete, as the principal unit of the fleet, its strength and influence have been greatly impaired."

Nations in Agony of Want

Senator Stanley:—"I hope the Senator from Idaho will understand that I am in complete and ardent harmony with him as to the vital importance of the matter to which he calls the attention of the Senate and the country. The nations of the world, as the Senator from Idaho has so much better said than could I, are in an agony of oppression and want. The necessities of the people and the demands of the Governments have ground the taxpayers to the bone."

Save $240,000,000 and Have Better Navy

Senator Borah:—"Mr. President, the party which is now in power can not afford from any standpoint to permit any opportunity to go by to reduce expenses to the point where at least we shall not have to increase taxes; indeed, it will be unfortunate if taxes must be maintained even at the present rate. I hope, therefore, when the resolution which I have offered goes to the committee we may have an immediate consideration of it and an immediate report on it. It ought not to require long to consider the resolution. The whole matter was discussed a few weeks ago in this Chamber; every Senator's opinion is made up; and if the resolution cou'd be reported and passed and the Army curtailed as it proposes, it would be a vast saving in that particular.

"Then, if the Naval Committee would report out the bill which has been introduced by the able Senator from Utah (Mr. King) to adjust that situation, [*Senator King has proposed converting six battle cruisers, under construction, into aircraft carriers, to be equipped with pursuit, bombing and other types of airplanes*] we should save an expenditure in that direction of some $240,000,000, and still have a better Navy than we shall have by the expenditure of that sum. If there is any other way by which we can save, I do not know of it. We may cut out some expense here and there in a department, or we may dismiss a few employees and curtail here and there in a small way, but we can not cut down expenses in such manner as the Secretary of the Treasury says we must in order to hold taxes even to the present status unless we do it upon these two lines."

Gordon Bennett Balloon Race

The Aero Club of America has received the following special instructions for competitors in the Gordon Bennett balloon Race on September 18, 1921.

I. A. *Shipping of Material.*
The material must be shipped prepaid to the following address:

GARE TOUR ET TAXIS,
AERO CLUB DE BELGIQUE,
73 AVENUE LOUISE,
BRUSSELS, BELGIUM.

B. Material will be shipped free of charge from the above address to a hangar to be chosen by the Aero Club of Belgium.

C. Material will be insured against fire and theft from the moment it leaves the custom house until the moment of departure from the field by the organizing club.

D. The material must be at the place of destination on or before September 10th, at the latest.

II. *Composition Of The Material Besides The Balloon Itself. Every Competitor Must Have The Following.*

A. 20 meters (about 65 ft.) of gas filling hose of 200 to 300 m.m. (about 7 to 9 in.) diameter

B. At least 100 bags for inflation.

C. One barograph, constructed in such a manner that after it has been sealed it cannot be tampered with.

D. The Belgium Club also advises to bring a filling wagon.

III. *The Log*: Will be furnished by the Belgian Club and contains special instructions for the Pilots.

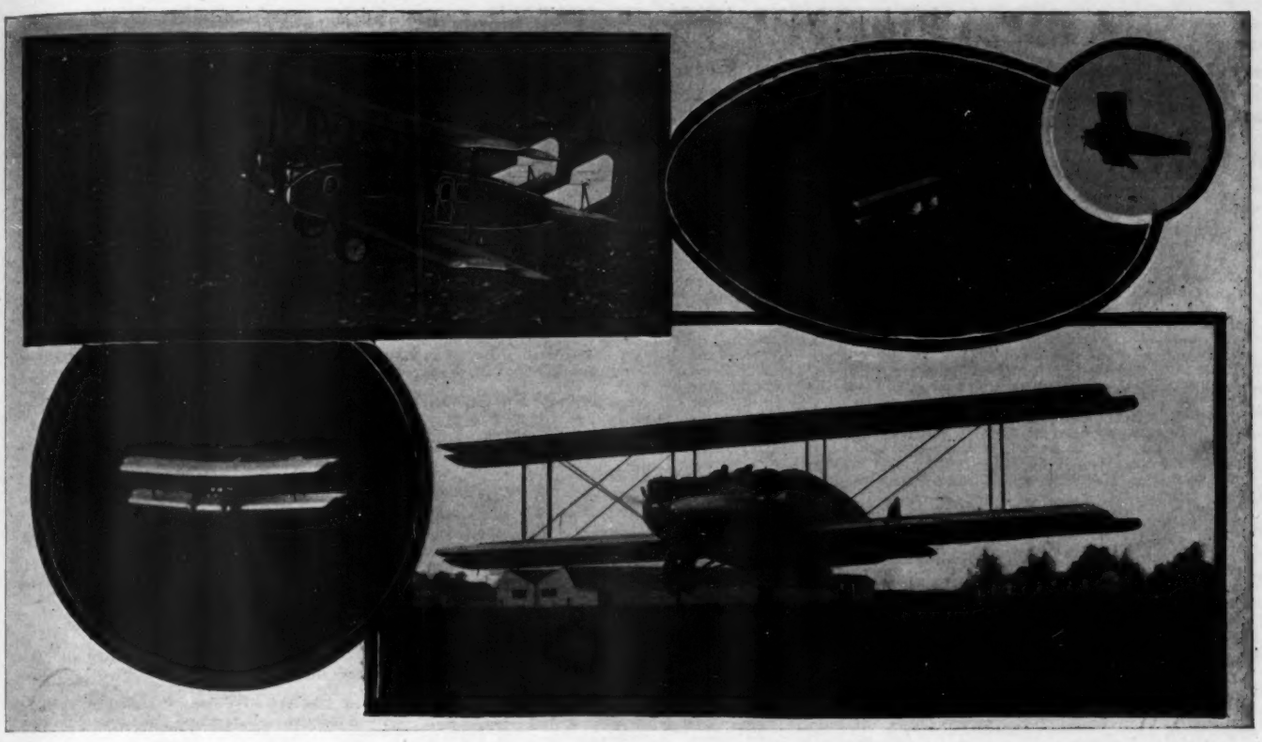
IV. *Inspection of the Material.*
The measuring of the cubic contents of the balloons by the Sporting Committee of the Aero Club of Belgium will take place beginning September 15th. The competitors are requested to be present on that date.

V. *Filling the Balloons.*
It is necessary that the filling of the balloons start September 17th at 3 p. m.

VI. *Lights.*
To conform to the Aerial Traffic Laws the balloons must carry during the night the regular lights being: A white light 5 meters (about 15 ft.) below the basket visible from all directions from a distance of at least 3 kilometers (about 2 miles).

VII. *Insignia.*
Every balloon must carry the pennant of its club and his national flag.

Tests of the Airliner



THE REMINGTON-BURNELLI AIRLINER IN FLIGHT

The accompanying photographs show to advantage the Remington-Burnelli Airliner in different stages of flight. This machine, the details and description of which appeared in the July 25 issue of AVIATION AND AIRCRAFT JOURNAL, has been undergoing tests at Curtiss Field, Long Island. Four test pilots, Bert Acosta, Randolph Page, Lloyd Bertaud, and Clarence Coombs have tested the machine and submitted reports of its satisfactory performance. Mr. Coombs is at present conducting a series of tests of 15 hr. flying time over a period of two weeks.

The question of probable blanketing of the propellers arose in a consideration of the design of the Airliner. Regarding it Mr. Coombs says that he has noticed no such effect whatsoever. Furthermore, he says that the machine flys well enough on one engine to enable an emergency landing field to be reached in case of necessity, and that there is no turning moment sufficient to make control of the machine difficult. In this connection it is interesting to know that the Airliner is being tested with temporary engines. The machine was designed for 1,000 hp. such as would be developed by two 500 hp. Packard engines or two geared Liberty engines of 500 hp. or more. The present direct drive Libertys were installed simply to expedite testing and thus verify the type before securing the more expensive engines.

At the outset of the present tests cooling system trouble was experienced with the result that the engines had to be throttled back to 1450 r.p.m. at which speed the horse-power of the Liberty is less than 300 b.h.p. However cooling system troubles have now been overcome and better results secured.

The Log of the machine to date shows 34 flights of from 10 min. to 1 hr. 15 min. duration; the total time in the air being 16 hr.

The Airliner is so obviously a commercial machine, and such an innovation in design—notably the lifting fuselage—that results of tests with the proper engines will be interesting as showing the increase in performance which will result with the increase in power.

Wind Tunnel Construction*

By J. H. Parkin and H. C. Crane

The wind tunnel at Toronto University is of the standard 4 ft. N.P.L. type and is installed in a hydraulic laboratory which is 40 ft. x 113 ft. x 17 ft. 6 in. This is well above required size of building for a wind tunnel of this type. The laboratory however contains a large amount of apparatus and bulky equipment such as engines, pumps and tanks, while a line of columns down the center necessitated placing the wind channel off center.

As a result of these undesirable features the flow of air in the room was very much disturbed, and an investigation was undertaken to determine the best form of intake to reduce the pulsations and secure a uniform distribution of velocity over the working cross section.

A large number of intake arrangements were tested of different types. The intake as finally adopted is in the form of a box equal in cross-section to the outside of the bellmouth, 6 ft. 5 in. square and projecting 30 in. from the face of the latter. The sides and front are made up of latticed gratings of 7/8 in. x 7/8 in. dressed stock, spaced one diameter apart in order to secure a directive effect on the air. The gratings are of the simpler slot construction as used in the later N.P.L. distributors. The flow gratings are screwed together and to the bellmouth to form a latticed box. Projecting from the corners and the mid points of the sides of the intake are eight guides bladed parallel to the channel axis. They are of 1/4 in. thick, three ply laminated wood supported on light iron brackets. The corner blades are 18 in. and the sides one 12 in. wide and 30 in. long. The eight guides are continued across the front of the intake in a star formation.

The investigation shows that the intake secures a satisfactory air stream under conditions very adverse from an aerodynamic point of view.

*Abstract of University of Toronto aeronautical research paper No. 3.

"Who's Who in American Aeronautics"

(Copyright, 1921, by The Gardner, Moffat Co., Inc.)

Every week, AVIATION AND AIRCRAFT JOURNAL prints the biographical sketch of men who are prominent in American Aeronautics. These sketches will be published later in pamphlet form. As so many of the officers change their stations often, it is believed that a semi-annual issue will be necessary. In compilations of this character many errors and omissions occur. It will be appreciated if corrections are sent to "Who's Who" Editor.

Samuel Meredith Strong

STRONG, SAMUEL MEREDITH, Major, Medical Corps, Air Service; born, Logansport, Ind., Aug. 8, 1877; son of Edward Strong and Margaret (Green) Strong; married, Zerlena Quimby, Sept. 1902.

Educated: Public schools of New York City; Friends School, Providence, R. I.; Columbia University; M. D. 1902, College of Physicians and Surgeons.

Professional: Practice of general operative surgery at New York City until 1917.

Aeronautical Activities: Began flying training, June 1918; designed airplane ambulance in June 1918; in command of fleet of airplanes on cross-country flight from Carlstrom Field to Hazelhurst Field and return to Florida, June 1919.

Flying Rating: Reserve Military Aviator, March 1919; Airplane Pilot, June 1920.

War Service: Medical Corps, U. S. Army, April 1917 to date.

Member: Air Service Medical Association; American Medical Association; New York County Medical Association.

Present Occupation: Major, Medical Corps, Air Service.

Address: c/o Chief Surgeon, Air Service, Washington, D. C.

John Graham Colgan

COLGAN, JOHN GRAHAM, Captain, Air Service; born, Philadelphia, Pa., Dec. 31, 1888; son of Richard A. Colgan and Minnie (Graham) Colgan.

Educated: Trenyffrin public school, Chester Co. Pa.; T. and E. High School, Berwyn, Pa.; one year, Pennsylvania State College; one year, Michigan Agricultural College; one year, University of Illinois.

Aeronautical Activities: Curtiss Flying School, Aug. 1916 to Oct. 1916; enlisted in Signal Reserve Corps, Dec. 30, 1916; instructor, Princeton Flying School, April 1917.

Flying Rating: Reserve Military Aviator, March 15, 1917.

War Service: Active duty, April 14, 1917; foreign service from Aug. 13, 1917 to May 29, 1919.

Present Occupation: Captain, Air Service.

Address: Kelly Field, Tex.; home, Berwyn, Pa.

Warren S. Eaton

EATON, WARREN S., Consulting Aeronautical Engineer; born, Rapid City, S. D., June 12, 1891; son of Frank J. Eaton and Annetta (Paine) Eaton; married, Pearl DeEtte Lerch, May 11. 1918.

Educated: South Dakota and California public schools; Polytechnic Institute, Los Angeles, Calif.

Professional: Engineer and aviator instructor and general manager of Eaton Bros. Airplane Co., 1908 to May 1912; designing engineer for Roy Knabenshue Dirigible Co., 1912-1913; engineer for Glenn L. Martin, 1913-1914; engineer, Lincoln Beachy, 1914-1915; chief engineer, N. Y. Aero Construction Co., 1915-1917; engineering department, Air Service, June 1917 to Dec. 1917; appointed by Production Division, Aircraft and Production Board as factory and production engineer at St. Louis, Mo., Dec. 1917 to Oct. 1918; chief draftsman and engineer, Production Engineering Division, Air Service, Oct. 1918 to April 1919; chief engineer, Chaplin Aircraft Corp., July 1919 to Jan. 1920.

Aeronautical Activities: Built gliding models, 1900 to 1905; power flying models, 1905 to 1906; built and flew gliders 1906-1907; formed Eaton Bros. Airplane Co., Los Angeles, 1908, which built and entered machine in first aviation meet held in America at Los Angeles, Dec. 1909 to Jan. 1910; Eaton Bros. built 43 machines for exhibition fivers from 1909 to May 1912; designed, built and flew with Roy Knabenshue a twelve passenger airship in 1913; built first successful loop plane in America for Lincoln Beachy, 1914, remaining with him as engineer until March 1915; organized New York Aero Construction Co., Nov. 1915, holding position as chief engineer until June 1917; appointed chief draftsman and engineer, Production Engineering Division.

Present Occupation: Consulting Engineer and private experiments.

Address: 915 Higgins Bldg., Los Angeles, Calif.; home, Van Nuys, Calif.

Walter I. Welden

WELDEN, WALTER I., Real Estate Dealer; born, Cosumne, Calif., Feb. 19, 1892; son of John Welden and Dora Welden.

Educated: Public schools of Picabo and Bellevue, Idaho; A.B. June 1916, William Jewell College.

Professional: High school teacher, 1916-1917; farming, June 1917 to Jan. 1918.

Aeronautical Activities: Feb. 1918, Aviation Section Signal Reserve Corps; June 1918, Ground school, School of Military Aeronautics, Berkeley, Calif.; Air Service Flying School, March Field, Oct. 1918 to May 1919.

Flying Rating: Reserve Military Aviator, May 1919.

Present Occupation: Real estate dealer.

Address: 4527 E. 4th Street, Long Beach, Calif.

Leon Edgar Sharon

SHARON, LEON EDGAR, 1st Lieut., Air Service; born, Hoopeston, Ill., April 13, 1890; son of Wm. J. Sharon and Hattie May Sharon; married, Ruth Gill, Nov. 22, 1919.

Educated: Public and high schools of Hoopeston, Ill.

Professional: Public Accountant, 1909-1917.

Aeronautical Activities: Began flying at Ellington Field, March 15, 1918; from 1918 to date, officer in the Air Service.

Flying Rating: Airplane Pilot, Jan. 1920.

War Service: Enlisted A.S.S.C., April 12, 1917; flying cadet from Nov. 3, 1917 to Aug. 1, 1918; 2nd Lieut., Air Service, Aug. 1, 1918 to July 1, 1920; 1st Lieut., Air Service, July 1, 1920 to date.

Present Occupation: 1st Lieut., Air Service.

Address: Kelly Field, San Antonio, Tex.

William Edwin Whitehouse

WHITEHOUSE, WILLIAM EDWIN, Nursery Business; born, Somerville, Mass., Aug. 29, 1892; son of Edward Ezra Whitehouse and Lillian Pearl Whitehouse.

Educated: Grimes Grammar School, Somerville English High School; B.S. 1915, Oregon Agricultural College; M.S. 1920, Iowa State College.

Professional: Research Assistant, Iowa Agricultural Experiment Station, 1916-1917; army, 1917-1919; Iowa Agricultural Experiment Station, 1919-1920; Capital City Nurseries, DesMoines, Iowa, 1920-1921.

Aeronautical Activities: S.M.A., Austin, Tex., Dec. 1917 to Feb. 1918; Camp Dick, Love Field, Feb. 1918 to July 1918; commissioned 2nd Lieut. A.S.A., July 1918; assigned to active duty at Love Field, Brooks Field; course in flying instruction and acted as flying instructor at Mather Field.

Flying Rating: Reserve Military Aviator, July 1918.

Present Occupation: Nursery business.

Address: 3410 S. W. 9th Street; home, 1198 Park Ave., DesMoines, Iowa.

Harold Percival Ayres

AYRES, HAROLD PERCIVAL, Commercial Aviator; born, Reading, England, March 8, 1894; son of George Ayres and Emma (Cook) Ayres.

Educated: Public schools of Reading, England and Minneapolis, Minn.; University of Toronto School of Military Aeronautics.

Professional: 1914-1916, salesman; Aug. 1919 to Nov. 1920, commercial flying with Canuck in Indiana, Illinois, Kentucky, Michigan and Ontario.

Aeronautical Activities: 1916-1919, Royal Flying Corps; 1919-1920, commercial flying; 1920-1921, organized Michigan Aero-Service Corp. which operates extensively in Michigan and has flying fields in all principal Michigan cities.

Flying Rating: Flying officer, R.F.C. 1916-1919.

War Service: Shatwick, Vendome, Dunkerke; later attached to Grand Fleet in North Sea.

Member: Royal Air Force Club, London; Mich. Comm, Aero Ass'n.; Aviation Country Club, Detroit; Aero Club of Illinois; American Legion.

Present Occupation: President and General Manager, Michigan Aero Service Corp.

Address: 117 E. Ionia St.; home, 414 So. Pine Street, Lansing, Mich.

Claude M. DeVitalis

DEVITALIS, CLAUDE M., Test Pilot; born, Milan, Italy, Aug. 25, 1891; son of Attilio DeVitalis and Adele DeVitalis; married, Mildred Romme, Dec. 18, 1919.

Educated: Morristown School for Boys; Savage Institute.

Professional: Instructor Medical gymnastics from 1915 to 1917.

Aeronautical Activities: Training S.M.A., Toronto, Canada, 1917; advanced training, Chattis Hill, England, 1918, also aerial gunnery training in Scotland.

Flying Rating: R.F.C. Flying Officer.

War Service: July 1917 to Oct. 1919.

Member: Aero Club of Canada.

Present Occupation: Test Pilot.

Address: Huff-Daland Co., Ogdensburg, N. Y.; home, 51 Riverside Drive, New York, N. Y.

Robert D. Moor

MOOR, ROBERT D., 1st Lieut., Air Service; born, Toledo, Ohio, Dec. 23, 1894; son of W. B. S. Moor and Agnes (McCormick) Moor.

Educated: Public and high schools of Toledo, Ohio; May 1916, Winona College of Agriculture.

Professional: Management of mercantile business.

Aeronautical Activities: Began training May 1918 at Payne Field; graduate, Pursuit and Aerial Gunnery Courses, Rockwell Field, 1919; Border Patrol, Sanderson and Del Rio, Tex., Nov. 25, 1919 to May 16, 1921.

Flying Rating: Airplane Pilot.

Present Occupation: 1st Lieut., Air Service.

Address: 1441 W. Delaware Ave., Toledo, Ohio.

Harold Lee George

GEORGE, HAROLD LEE, 1st Lieut., Air Service; born, Somerville, Mass., July 19, 1893; son of Horace George and Susan E. George; married, Anna Virginia Helms, Aug. 10, 1917.

Educated: Public schools of Somerville, Mass. also high school; LL.B., National University, School of Law.

Professional: Secretary to Mr. Justice McReynolds, United States Supreme Court; Secretary to the Comptroller of the Currency, Hon. John Skelton Williams.

Aeronautical Activities: Graduated from Princeton University Ground School, Dec. 8, 1917; elementary flying training, Love Field; commissioned 2nd Lieut., March 28, 1918; took course as Observation Pilot, Post Field; took course as Bombing Pilot at Clermont-Ferrand, France.

Flying Rating: Airplane Pilot.

War Service: France, Aug. 1918 to March 1919.

Present Occupation: 1st Lieut., Air Service.

Address: 1425 Chapin St., N. W., Washington, D. C.

Phillips Melville

MELVILLE, PHILLIPS, 1st Lieut., Air Service; born, Boston, Mass., Nov. 18, 1895; son of Henry Hulme Melville and Marcia (Lord) Melville.

Educated: Harrow School, Harrow-on-the-Hill, Middlesex, England, 1911-1915.

Professional: Student, National City Bank of New York (Foreign Trade Department), 1916-1917.

Aeronautical Activities: Enlisted, June 11, 1917; S.M.A., Austin, Tex., June 16 to Aug. 11, 1917; A. E. F., Sept. 11, 1917; Campo-sud, Foggia, Italy, preliminary and advanced flying, Oct. 16, 1917 to Aug. 5, 1918; Campo Cascina Malpensa, Gallerata, Italy, Aug. 7 to Sept. 6, 1918; R.A.F. School of Aerial Navigation, Worthy Downs, Winchester, England, Oct. 5 to Oct. 20, 1918; R. A. F. School of Night Bombardment, Stonehenge, England, Oct. 20 to Nov. 7, 1918; returned to U. S. Dec. 10, 1918; Hazelhurst and Mitchel Fields, Dec. 30, 1919 to Dec. 28, 1921; Langley Field, Dec. 1921 to date; piloted Caproni, New York-Toronto Race, 1919.

Flying Rating: Italian First Brevet, Dec. 20, 1917; Italian Superior Brevet, Jan. 19, 1918; Airplane Pilot, July 25, 1918.

Present Occupation: 1st Lieut., Air Service, Langley Field, Va.

Address: 19 West 31st Street, New York, N. Y.

Bombing at Aberdeen

By Our Washington Correspondent

In general there are four types of aerial bombs, and they may be seen any day at the Army Ordnance Proving Grounds at Aberdeen, Md., a tract of fifty square miles bought during the war for the testing of all army guns and ammunition. Each type has its special mission to perform; each type varies in size according to the work for which it is intended.

Most important of all are the demolition bombs, such as those fired at the Ostfriesland and other one time German vessels which were turned over to the United States under an Allied agreement to be sunk in the tests just ended. The other types are the fragmentation bombs, to send out waves of shot capable of mowing down large bodies of troops; the incendiary bombs; to set fire to villages, cantonments and fields, and gas bombs.

So it is that the air forces are prepared to attack any problem that may be placed before them, assured that the proper type of bomb will be on hand. The types of bombs are the result of study and development by engineers of the Army Air Service and the Ordnance Department and tests at the Aberdeen Proving Grounds under the direction of Capt. Norbert Carolin, of the Army Air Service.

There are two types of demolition bombs, the thin-wall and the armor-piercing. The thin-wall bombs, constructed with a maximum of explosive contained in a comparatively thin case, are about 60 per cent TNT, while the armor-piercing bombs, weighing the same, but designed to go through heavy armor plate, such as might be placed on the deck of a battleship, contain but five per cent of TNT. The thin-wall bomb that has proved the most efficient up to date, since its detonation under the water has shown it to be sufficient for the sinking of warships such as the one time German cruiser Frankfurt and the dreadnought Ostfriesland. These vessels went down, not from the bombs that hit the decks, but from those which went close to the side, detonating in the water with force sufficiently great to stove in the hulls.

The thin-wall demolition bombs are of graduated sizes from 25 pounds upward. The 25 lb. bombs are intended for use by the single-seater pursuit planes, in the preliminary attacks, to clear the air of hostile aircraft and to put anti-aircraft guns out of action. Tactics require these pursuit planes to dive to within a short distance of the target, 150 ft. perhaps, so that the bombs may be placed effectively, destroying all anti-aircraft personnel and opening the way for the heavy bombing airplanes which carry the more destructive missiles.

The next size above the 25 lb. bombs are those weighing 100 lb. From there the size increases to 300 lb., from there to 600 lb. and then to 1,100 lb. The 2,000 lb., or one-ton bombs, are, for the present, the highest type so far developed, although there now is being constructed a bomb weighing two tons.

What a bomb weighing two tons would do to a modern dreadnought can only be imagined. It is the honest opinion of those who have been following the developments and have seen 2,000 lb. bombs in action that man cannot design a warship capable of withstanding the force of such an explosion.

It is on the plans of such a vessels that naval constructors now are working.

As an important sidelight on the size of bombs that may be carried it has just been announced that Glenn L. Martin has prepared plans for an airplane capable of carrying 7,500 lb. of bombs. And this machine is intended to have a cruising radius of ten hours at 100 m.p.h. instead of as at present, five hours at 90 m.p.h. Apparently there is no reason why this machine should not carry a bomb of 7,500 lb.

As bombs are developed it is necessary to test them, to determine their characteristics. For this reason there have been constructed at Aberdeen a series of contrivances, on which the bombs and their parts are tested. For instance, a three-story building with two-inch oak floors at each story, has been erected to test the penetrating qualities of the bombs. Live bombs are not used in this test since they would destroy the structure, the bomb cases only being employed when filled with sand. It is interesting to note that sand weighs approximately as much as TNT. The penetrating ability of a bomb depends, it has been learned, on the altitude from which it is dropped. It gathers force on its downward course. Bombs dropped from an altitude of 5,000 ft. penetrate the heavy building.

AN AERIAL TORPEDO

One of the other tests for bombs is that on a square surface built of concrete. This surface is 100 ft. square and two feet thick, one foot of heavy grouting and one foot of sidewalk mixture cement, which, of course, is extremely hard. In this test, as in the other, bomb cases are filled with sand to weight, to determine their carrying ability.

There are several sets of high panels around a circle fifty feet in diameter where the officers in charge of the experiments learn the velocity of fragments from the explosions. This is accomplished by placing a certain grade of paper over holes in the panels. Such panels also are used in finding the value of the fragmentation bombs. These panels, however,

A Naval Bomb

are only six feet high, whereas the others run to 20 and 25 ft., and are so arranged as to show the effect of fragmentation bombs when employed against troops in the field. Paper is pasted over these panels and the distribution of the shot from the bomb recorded after each one is dropped.

The bombing experiments at Aberdeen have been conducted with all types of ammunition to gather information of value in fixing the standard types and sizes. The British Government has been particularly active in the development of aerial bombs, and the largest of these bombs that have been in use at Aberdeen weigh 1,650 lb. The largest American bomb so far in use exceeds that size by 350 pounds. These British bombs are much different in appearance from those adopted as the American standard. They look much like the ordinary hot water heater, riveted together. The American bombs are carefully shaped, with rudders and other appliances to give accuracy in fire.

The testing of bombs at Aberdeen is going on continually. On one day four pilots dropped 22,500 lb. of bombs in a series of tests. The main activity, of course, was just prior to the bombing tests off the Virginia Capes, when ammunition was being prepared and tested for those experiments. It is a tribute to the character of this ammunition to record that out of all the bombs dropped by the Army only one of them, weighing 600 lb., was a "dud". The Navy was much less fortunate in its record.

It is the opinion of ordnance experts that there is no limit to the size of effective bombs that may be constructed, except the ability of airplanes to carry the load. Bombing from the air must be regarded as in its infancy, with the promise of more startling events in the future.

Japanese Propellers

A report in the Osaka Mainichi Shimbun states that a Japanese company at present manufacturing pianos and organs has been designated as a factory to manufacture propellers. Whether the designation has been made by the government, or whether the company has merely decided to take up the manufacture of propellers as a business policy, the report does not state.

Radio

The use of radio telegraphy and telephony in the Air Service is becoming increasingly more important, as shown by the radio activities of the Engineering Division at McCook Field. Many types of radio apparatus are being tested and experimented with in the Radio Laboratory.

Work at this time is being done on various types of apparatus, including a 5-kilowatt spark transmitting set which has a range of about 1000 miles, a 2-kilowatt tube set which has a range of about 600 miles, a 1-kilowatt telephone set which has a range of several hundred miles, as well as various smaller radio telephone sets which have ranges of from 15 to 100 miles. In addition to this apparatus tests are also being conducted with telegraph and telephone apparatus which is used on airplanes and includes a telegraph set having a range, from airplane to ground, of 100 miles and various telephone sets having range of from 15 to 100 miles. Thus in the course of tests it is possible to carry on conversation from the radio laboratory with an airplane which is flying at a distance of 50 miles from the field as easily as it is to carry on conversation over the ordinary wire telephone from the house to the office.

In addition to communication, radio is also being used in the Air Service to-day for the purpose of assisting in navigation, particularly in the case of above-the-cloud flying. By means of direction finding loop stations located on the ground, it is possible to ascertain the bearing and the location of any airplane that is flying in the vicinity. Thus, if an airplane is flying above the clouds and is in doubt as to its exact location, the radio operator in the airplane calls these ground direction findstations and asks that he be informed as to his whereabouts. These ground direction finding stations immediately take bearings on the airplane, and by means of triangulation determine its location. This information is then transmitted to the airplane by either radio telephone or radio telegraph.

By means of special radio direction finding loops instaled on an airplane, it is possible to fly drectly towards any radio transmitting station. Thus it is possible for airplanes to rise above the clouds and to fly directly to another station without seeing the ground until its arrival and landing.

Aircraft Bomb Exploding
Courtesy U. S. Naval Institute

The "Bristol" Ten-Seater Airplane

The Bristol Ten-seater Airplane is a single engined tractor biplane having an enclosed cabin for eight passengers and an open cockpit for pilot and mechanic.

Engine Installation

The Napier 450 hp. engine which is fitted, is on a readily detachable mounting which also carries the nose radiator and oil tank. Complete access to the engine can be obtained by releasing six self-locking fasteners, no part of the cowl being removed from the machine.

Electric starting is fitted and also hand turning gear operated from the ground.

Cabin

The cabin is entered through a door aft of the lower plane and seats five of the passengers facing forward in separate chairs, the other three facing aft. The seats are collapsible and when folded project only five inches from the saloon sides, leaving a maximum of floor space if it is desired to carry cargo in lieu of passengers.

Windows, which can be opened, are fitted the full length of both sides of the cabin, and heating is provided by means of hot air muffs round the exhaust pipes. For the convenience of passengers liable to air-sickness a small concealed, self-emptying basin has been provided in close proximity to each seat. These fold against the side of the saloon and are readily accessible, the waste pipe discharging through the floor.

When it is desired to use the machine solely for the transport of cargo the space available is length 10 ft. 6 in., height at center, 5 ft. 9 in., width 4 ft.

Pilot's Cockpit

The roomy cockpit in which the pilot and mechanic are accommodated is situated between the fire bulkhead and the front spar of the top plane. An exceptionally fine field of view is thus provided.

Baggage Hatch

Below the pilot's cockpit is a compartment 4 ft. 6 in. long x 4 ft. wide x 2 ft. 6 in. high, accessible through a trap door in the underside of the fuselage. This is intended for the conveyance of passengers' baggage or for other suitable cargo.

Fuel System

The two main fuel tanks, of 50 gal. capacity each, are slung under the bottom planes at the inner interplane struts. Fuel is drawn from either of these tanks by two Vickers' centrifugal pumps coupled in series, and delivered through a Vickers' hand pump to the carburetors, any surplus passing to a 10 gallon gravity tank and overflowing back to the particular main tank in use. Smiths' capacity gauges for both main tanks are fitted on the instrument board.

Landing Gear

The landing gear is of the four-wheeled Oleo-elastic type, with wheels in tandem, brakes being fitted to the rear wheels and operated by a car type brake lever in the pilot's cockpit. A gate is provided for the brake lever so that the brakes may be operated together or singly as required.

Elastic rings are used for suspension and the elastic carriers have been designed for ready renewal of these rings.

The Oleo plungers are fitted with a special type of tapered needle valve to control the passage of the oil through the plunger to give constant oil pressure throughout the stroke of eight inches.

Flying Controls

Single control of the wheel type is fitted, all cable pulleys being five inches diameter.

Tail Trimming Gear

The tail incidence can be varied by a lever and quadrant adjacent to the pilot to trim the machine under all conditions of speed and load distribution.

Safety Devices

Behind the engine a steel fireproof bulkhead has been fitted, and all control connections pass through glands. No fuel is carried in the body of the machine aft of this bulkhead.

In the roof of the machine a special emergency exit is provided, measuring 2 ft. 2½ in. x 2 ft. 2 in. This is operated by a quick release gear should occasion arise.

Specifications

Dimensions

Span	54 ft. 0 in.
Length Overall	42 ft. 0 in.
Height	11 ft. 0 in.

Weights

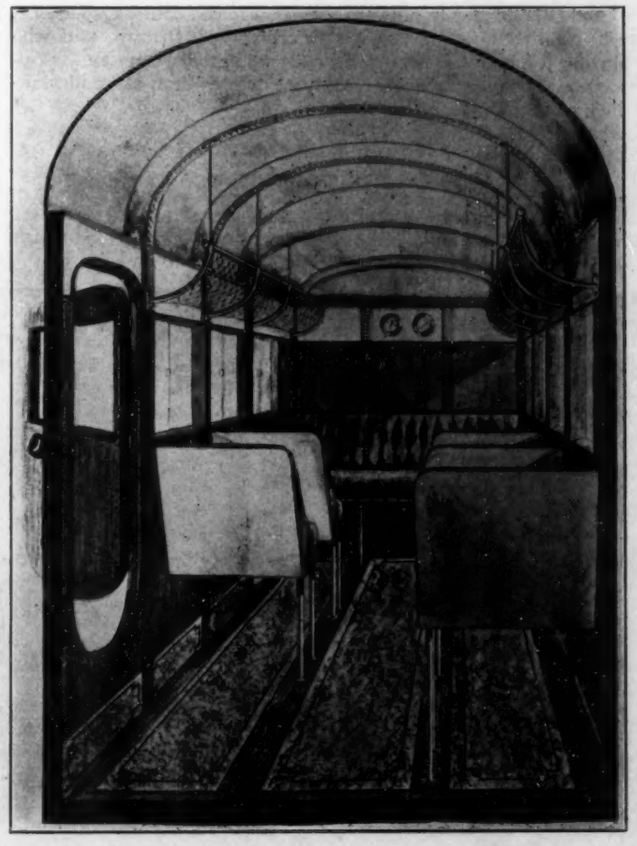
(a) As Passenger Machine	
Machine empty, with water	3,900 lbs.
Radio Installation	63 lbs.
Fuel & Oil for 400 miles (100 gal. Gasoline) (6 gal. Oil)	798 lbs.
Crew (2)	360 lbs.
Passengers (8)	1,280 lbs.
Baggage (50 lbs. per passenger)	400 lbs.
	6,801 lbs.
(b) As Cargo Machine	
Machine empty, with water	3,800 lbs.
Radio Installation	63 lbs.
Fuel & Oil as above	798 lbs.
Crew (2)	360 lbs.
Cargo	2,079 lbs.
	7,100 lbs.

Loading

(a) As Passenger Machine	
Weight/hp. (Napier 'Lion' at 450 hp.)	15.1
Weight/sq. ft.	10.1
(b) As Cargo Machine	
Weight/hp.	15.8
Weight/sq. ft.	10.6

Performances

	Full load	Half load
Speed at ground level	122 m.p.h.	124 m.p.h.
Speed at 5,000 ft.	116 m.p.h.	120.5 m.p.h.
Speed at 10,000 ft.	114 m.p.h.	117 m.p.h.
Time to climb to 5,000 ft.	9 min.	7 min.
Time to climb to 10,000 ft.	22 min.	17 min.
Ceiling	13,500 ft.	15,500 ft.



Cabin of Bristol 10 Seater

Maintenance Service for Aircraft

A service designed to supply requirements of pilots and airplane operating companies for repairs and overhaul of flying boats has been established at College Point, N. Y., by the American Airways. This new organization has taken over on lease several buildings of the plant of the College Point Boat Corp. The main structure is a two story building approximately 100 x 60 ft. with a runway leading directly into Flushing Bay where excellent facilities are maintained for prompt work.

The company is at present overhauling several HS-2L flying boats and fitting them with new Liberty engines. The wing department on the second floor is busy recovering wings for these machines. In addition to prompt overhauls and repairs the American Airways have adopted a system of cost plus 20 per cent for all such work. Another feature of their service is supplying the best pilots and mechanics to other companies. The organizers of the American Airways are W. G. Schauffler, Jr., Hugh D. McKay and T. L. Tibbs.

Lighter-than-Aircraft in Canada

To date at least one commercial firm has taken advantage of the Canadian Air Board's recent offer respecting the loan of lighter-than-aircraft, complete with all necessary equipment, for experimental operations this summer, the object being to demonstrate the usefulness of this type of craft for certain kinds of air work in Canada.

The firm in question is the Keewatin Lumber Co. of Keewatin, Ontario, who are planning to undertake Lighter-than-air operations in the Lake of the Woods area in Northern Ontario. As far as present information is available the character of the operations will include the following:—

(1). Forestry reconnaissance, photography and fire detection.

(2). Preliminary Surveys for proposed railroads.

(3). Special reconnaissance and surveying in connection with proposals for the storage of water power.

It is of interest to note that Colonel R. H. Mulock, D. S. O., who was recently on the Air Board's staff, Ottawa, and who during the late war acquired a very wide experience in air operations, will be in charge of these lighter-than-air undertakings of the Keewatin Lumber Co.

An Acknowledgment

In the August 1 issue of AVIATION AND AIRCRAFT JOURNAL we neglected to make acknowledgment to *The Aeroplane* for the article on "Flexible Fuel Pipes" and so we do so now.

Canadian Air Board Report

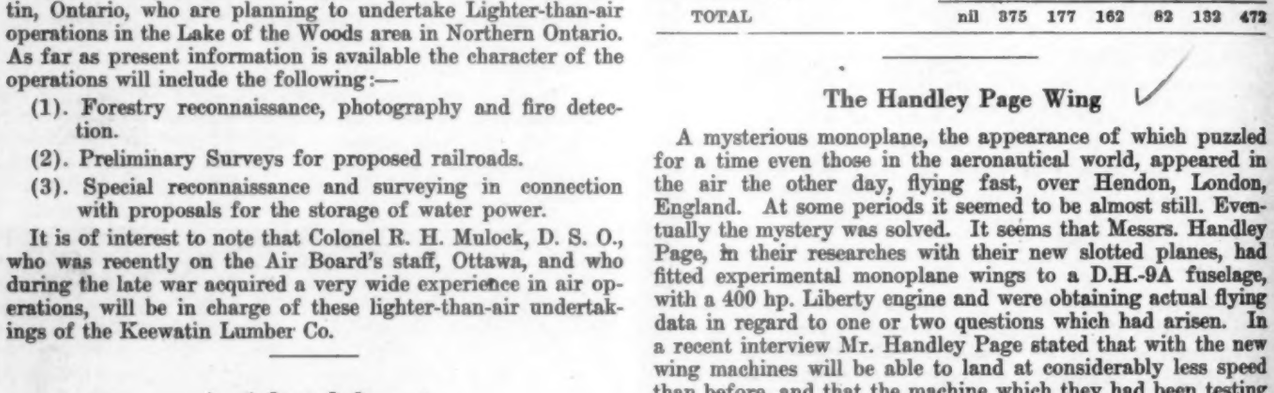
In view of the present agitation in this country for legislation to provide for the licensing of aircraft and airports and the personnel associated with them the following report of the Canadian Air Board is interesting in that it shows the strides which have been made in this direction by Canada.

SUMMARY OF CIVIL AVIATION CERTIFICATES AND LICENSES ISSUED, CANCELLED, RENEWED AND STILL IN FORCE FOR PERIODS AS SHOWN. SUMMARY ISSUED JUNE 30TH, 1921

	1921—JANUARY 1 TO JUNE 30, 1921						
	CERTIFICATES AND LICENSES						
TYPE OF CERTIFICATE OR LICENSE	Applications Refused	Carried Over In Force From 1920	New 1921 Issues	Lapsed Suspended or Cancelled	Renewals or Reinstatements	1921 Issues In Force On June 30th, 1921	Total in Force On June 30th, 1921
Private Air Pilots	nil	53	10	14	12	6	61
Commercial Air Pilot's	nil	83	44	100	70	34	97
Air Engineer's	nil	83	72	15	nil	53	140
Air Navigator's	nil	nil	1	nil	nil	1	1
Airship Officer Pilot's	nil	nil	nil	nil	nil	nil	nil
Registration of Aircraft							
Civil Aviation M/cs	nil	61	8	9	nil	8	60
Civil Government M/cs	nil	13	12	nil	nil	12	25
Can. Air Force M/cs	nil	45	22	9	nil	13	58
Airharbour Licenses							
Civil Aviation Airh'brs	nil	31	6	14	nil	3	23
Civil Govt. Airh'brs	nil	5	2	1	nil	2	6
Can. Air Force	nil	1	nil	nil	nil	nil	1
TOTAL	nil	375	177	162	82	132	472

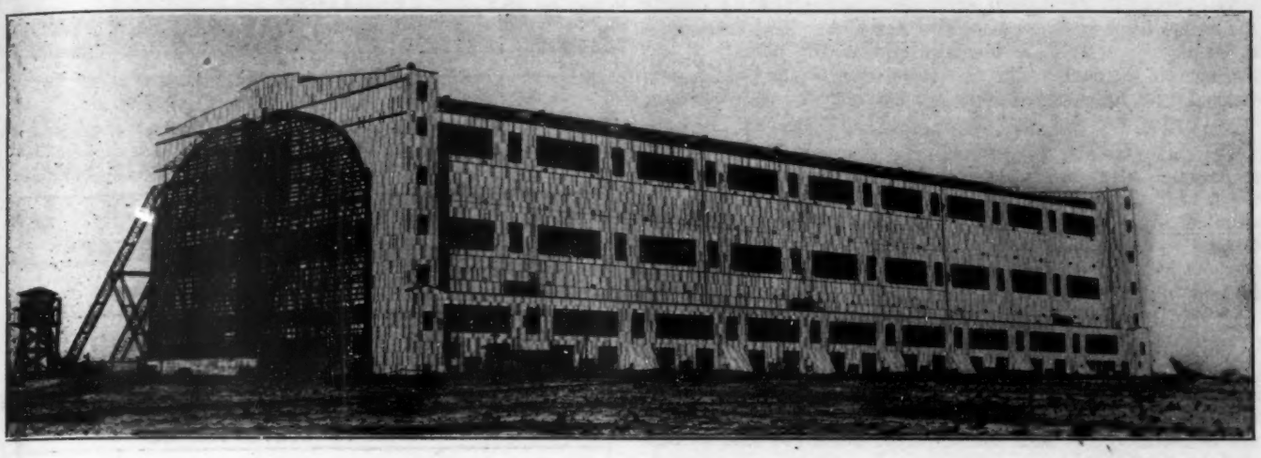
The Handley Page Wing

A mysterious monoplane, the appearance of which puzzled for a time even those in the aeronautical world, appeared in the air the other day, flying fast, over Hendon, London, England. At some periods it seemed to be almost still. Eventually the mystery was solved. It seems that Messrs. Handley Page, in their researches with their new slotted planes, had fitted experimental monoplane wings to a D.H.-9A fuselage, with a 400 hp. Liberty engine and were obtaining actual flying data in regard to one or two questions which had arisen. In a recent interview Mr. Handley Page stated that with the new wing machines will be able to land at considerably less speed than before, and that the machine which they had been testing has landed at 35 m.p.h. instead of its previous speed of 45 m.p.h. When perfected in a commercial form the Handley Page wing will, it is calculated, enable ten passengers to be carried at 100 m.p.h. with the power of one 350 hp. engine.



BRISTOL TEN SEATER AIRPLANE

Details of the Lakehurst Airship Station



THE COMPLETED HANGAR AT THE LAKEHURST NAVAL AIRSHIP STATION

Wide World Photo

(*In the August 1 issue of* AVIATION AND AIRCRAFT JOURNAL *we published a descriptive article on the Lakehurst Naval Airship Station. Further particulars of this station are now available together with a picture of the completed hangar which will house the ZR-2 when it arrives in this country.*—EDITOR.)

The establishment of a station to build and operate rigid airships requires many other structures in addition to the hangar. A large power plant to furnish electricity for operating the doors and lighting the hangar and other buildings, and for furnishing necessary steam for heating the hangar, etc., is also nearing completion. Barracks and mess halls for 500 enlisted men are being provided by fitting out the Army barracks which were on the site at the time the field was taken over. A large hydrogen plant capable of producing 60,000 cu. ft. of hydrogen per day is under construction, including a gas holder of 1,000,000 cu. ft. capacity. The necessary distribution systems such as water, hydrogen, gasoline, electricity, steam, and compressed air are completed.

The entire landing field comprises an area of approximately 1400 acres, a large part of which has been cleared and graded to permit of the safe landing and handling of the airships. Facilities for radio communication and meteorological observations are also provided.

An interesting feature of the hangar are the docking rails which run through the shed and extend 1500 ft. at each end. These are in effect conduits with narrow slots through which lines reaching from a trolley inside the conduit can be extended to the airship being launched or docked, and are similar in general detail to the ordinary trolley or conduit construction with slots except provision has to be made for the uplift of the airship. A trolley of special design is provided which when not in use rolls along the bottom track in the conduit but when in use for docking or launching rolls in its upper bearing on the under side of the slot rail.

There was considerable difficulty in designing a detail of the crossing of this conduit with the door tracks. It was found necessary to provide some closure of the slot during the passage of the door trucks because of the shock to so large and heavy a structure by the jolting over this opening. Accordingly at each crossing of rail with slot there is a moving rail which can be thrown by interlock connecting rods tying together all of the crossing. When the doors are not in use, this rail leaves the slot open for the passage of the trolley and guys and line to the airship. When the door is about to be moved, the connecting rod is thrown and the rails move up to fill up the slot opening and provide a continuous track for the door.

The doors are mounted on standard gange trucks which travel on two lines of track laid on concrete base. They are driven by electric motors with the power transmitted through a plow which collects current from conductors in a slot. This slot or conduit, however, only approaches the outer edge of the door, so as to avoid possible fire risk of electric conductor near the open door of the hangar. In addition to the electric drive, an emergency winch with cables for hand operation is provided to open and close the doors in case of the falling of the current or motor.

Special attention had to be paid to the lighting of the hangar because of the possible presence there of an explosive mixture due to the escape of hydrogen from the dirigible. Therefore, no wires or exposed connections are taken inside of the shed. All lighting is through heavy glass covers in walls and floor and roof with the connections well outside the structure and with gas-proof glass covers. On account also of the gas which is used to fill the balloons, the lights in the skylights are of actinic glass which will cut out the detrimental rays.

Special provision for working in the hangar is made by a number of so-called catwalks, which are horizontal balconies running along under the roof. Fastenings are placed at the various roof rafters for traveling hoists.

The main doors at each end of the structure are novel in design. The two ends are in duplicate and each has a two-leaf rolling, self-supporting door which is 177 ft. high, 136 ft. long and 77 ft. deep. These doors are of structural steel framing covered with asbestos siding are electrically operated.

The hangar was designed by the Bureau of Yards and Docks under the direction of Rear Admiral C. W. Parks, Chief of Bureau, and Commander Kirby Smith, Project Manager. Mr. J. Michaelson had charge of the engineering computations, and Mr. Wm. Partridge developed the architectural details.

Crossing of the ZR-2 Delayed

A recent report issued by the Naval Air Service states that the crossing of the ZR-2 has been further delayed due to some structural changes required.

Minneapolis to Chicago

A recent instance of service by airplane in its proper sphere was a flight from Minneapolis to Chicago by a machine with Major Miller as pilot and carrying two passengers. The 420 miles separating the two cities were covered in 3 hr. 52 min., an average speed of more than 100 m.p.h.

Airdrome Notes

Truro, Nova Scotia

The Canadian Air Board announces the cancellation of the Airharbor License of the Eastern Canada Air Lines' airdrome at Truro, Nova Scotia. The airdrome is 1½ miles N.E. of the city on the north river road, was open to the public, and marked by a right-angled cross in a square.

Toronto, Ont. Ca.

The Canadian Air Board announces the cancellation of the commercial Airharbor License of the Ericson Marine & Aircraft, Ltd. airdrome and the issue to this company of a public customs Airharbor License for the same airdrome, which is 6 miles N. of Lake Ontario on the N.E. edge of the city, and now marked by a square enclosing a circle, both of which are divided in half by a line.

Atlantic City, N. J.

The Curtiss Aeroplane & Motor Corporation has two stations at Atlantic City, one, for hydroplanes, located at the inlet, at the extreme eastern end of the boardwalk, the other for landplanes located about one-half mile inland, at the other end of the city, alongside the principal boulevard leading out of Atlantic City.

The water station, for hydroplanes, can be distinguished by the name on the roof of a large brick hangar. There are two hangars at the airport for landplanes. Supplies can be bought by wiring the Curtiss Flying Station.

Buffalo, N. Y.

The Curtiss Airplane & Motor Corporation Field at Buffalo is located 7 miles northeastward of the city and about 2 miles east of the large bend in the Niagara River northward of the city of Buffalo.

The field is easily distinguished from the air by a long scraped runway, but care must be taken in landing, as there are several cross ditches; these are, however, marked by red flags.

The field has two hangars and is open from April 1 to December 1.

Supplies and services are available.

Garden City, L. I., N. Y.

The Curtiss Aeroplane & Motor Corporation reports that their Garden City Field is located about 21 miles from New York, between the towns of Garden City and Hempstead, about 3 miles northeast of Hempstead Reservoir, which is plainly visible from the air.

The field is open at all times to the public, and service and repair facilities for all types of machines are available at the field or at the factory, which is one-half mile distant.

– The field may be distinguished by the buildings located on the west and north sides, which are white, with the name of the field in large white letters on one of the roofs.

Dallas, Tex.

The McGraw Aviation Company have leased a landing field at the end of the city viaduct, less than a mile from the heart of Dallas, Texas, where they expect to carry on various flying activities, including aerial transportation, flying instruction, aerial photography, etc.

The field is in charge of Pilot McGraw, former army pilot at Mitchel Field, and under the supervision of the Southern branch of the Curtiss Airplane and Motor Corporation, which furnishes inspection.

Trinity Springs, Ind.

Trinity Springs, Martin County, Ind., has established a municipal flying field. Pilots are invited to make free use of the field, where fuel and oil may be obtained. Trinity Springs is known as a prominent Indiana health and rest resort with an excellent hotel. The field is located at the northwest corner of the grove surrounding the springs and bathing pool.

The Oneal-Walker Aerial Service of Oakland City, Ind., is at present operating from Trinity Springs field.

Lawton, Okla.

Report has been received of the establishment of a commercial airdrome at this city. No details as to the location and ground marking of the field are as yet available, but it is understood that a company will be operating from it and that hangar space, fuel, and oil will be available.

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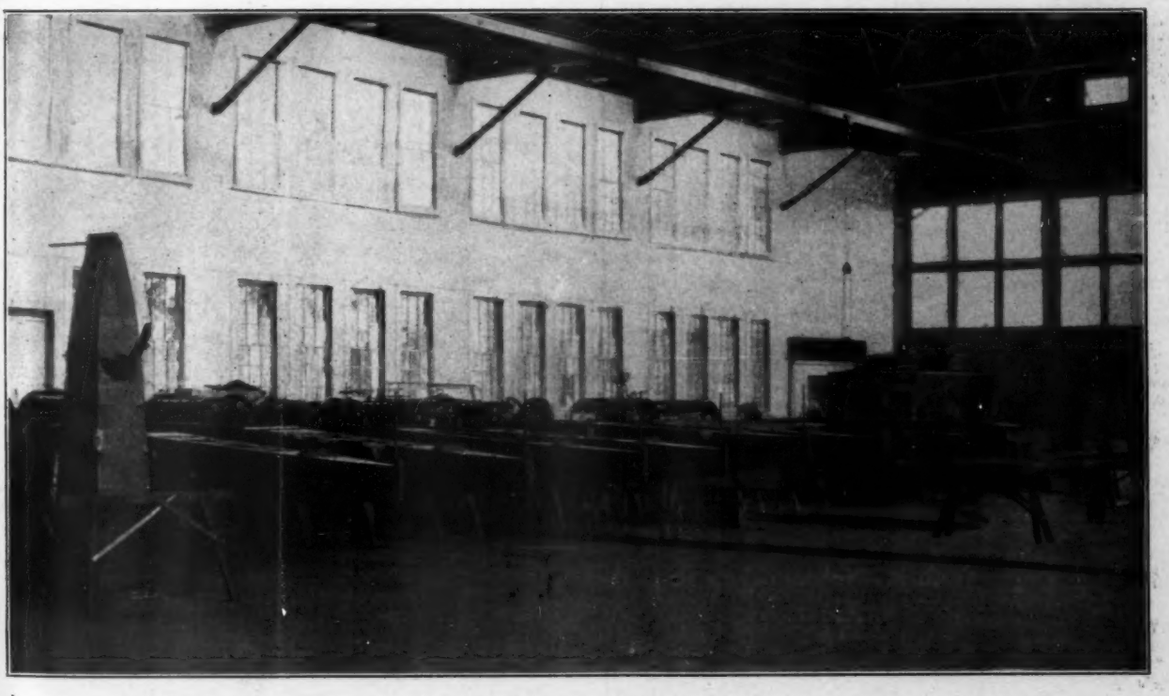

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